UNITED STATES ARMY

Army Materiel Command

HANDBOOK 715-16

CP^2_{2000}

Assessor Guide

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U.S. ARMY MATERIEL COMMAND

Contractor Performance Certification Program ($(CP)^2$ 2000)

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This document is intended for use by the AMC Assessor Team as guidance in the administration and performance of the $(CP)^2$ 2000 Program only. The information contained in this document may be utilized by any organization considering or performing the process, but is not designed as mandatory guidance and not contractually binding.

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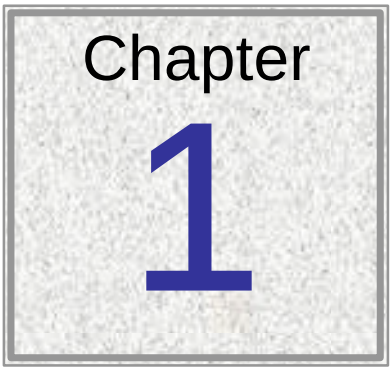

Introduction

1-1. PURPOSE

a. The purpose of this document is to provide a standard Army methodology to assess and measure the performance of design/development, production, and maintenance facilities against uniform and definitive standards of excellence. Certification areas are defined for both production and design/development facilities. It provides a uniform, structured approach for the performance of self-assessments and Government assessment of any participant's Quality Management Program.

b. The guidelines define the methodology to be used in validating a participant's conformance with the concepts of $(CP)^2$ 2000. $(CP)^2$ 2000 mandates a high level of quality management be maintained throughout the organization, induces a total partnership between the participant and Government, and strives for reducing risk within the participant's operations. It is consistent with and complementary to other initiatives within the Department of Defense (DoD), such as DoD 4245.7-M: Manual on Transition from Development to Production (Critical Path Templates), DoD Instruction 5000, and Defense Logistic Agency's (DLA) One Book. All of these are aimed at increasing participant performance while reducing overall participant costs and government administrative costs. It is compatible with Department of Army (DA) initiatives like acquisition streamlining, taking full advantage of a participant's industrial practices and seeking to reduce unnecessary oversight. In addition, these guidelines are compatible with the international standards under ISO 9000 and national standards under (ANSI/ASQC Q9000). This document provides general guidance in the planning and performance of on-site assessments of a participant's development, production, and maintenance activities leading to facility certification.

1-2. SCOPE

a. The intent of this document is to provide guidance, which shall be used by AMC activities and other Government activities, as they deem appropriate.

b. This document may be used by all participants for their self-assessment.

c. This document contains all areas to be assessed. The depth and breadth of assessments may vary. For this reason, skilled assessors with the appropriate background experience will be used to determine the detail of area assessment.

1-3. DEFINITIONS

a. Assessment: A comprehensive review of a participant's facility and operation by the assessment team using the $(CP)^2$ 2000 assessment areas.

b. Assessment Areas: Specific guidelines pertaining to the Quality Management System. For each area, the participant will be rated in accordance with established scoring guidelines to reflect the degree of adequacy of both documentation and compliance.

c. Assessment Team: The personnel who conduct $(CP)^2$ 2000 assessments.

d. Assessment Team Leader: The individual assigned to prepare and conduct an assessment. The assessment team leader may be the same individual as the $(CP)^2$ 2000 POC, or may be a different individual.

e. Assessor: An assessment team member.

f. Certification: Formal, written recognition of a participant, acknowledging total compliance to $(CP)^2$ 2000 assessment areas.

g. Contract: For the purposes of this program, a contract is any formal agreement which identifies the scope and requirements of the work or service to be performed; e.g., acquisition contracts, purchase orders, scopes of work, etc.

h. Contract Administration Service (CAS): For the purposes of this program, CAS is defined as the Government organization that administers the contract; e.g., Defense Contract Management Command (DCMC), in-plant Government staff, etc.

i. Contractor Performance Certification Program, $(CP)^2$ 2000: An AMC program that recognizes those design/development, production, or maintenance/storage facilities and operations (government or private) that consistently deliver a quality product or service, provide evidence of process control and/or design control as appropriate, employ preventative/proactive quality assessment techniques and demonstrate aggressive and continuous efforts to improve quality and productivity.

j. $(CP)^2$ 2000 Scorecard: A formal, written indication of the participant's continued compliance with the requirements of the $(CP)^2$ 2000. Usually issued after a management review.

k. $(CP)^2$ 2000 POC: The individual assigned responsibility for a specific participant. May or may not act as the assessment team leader for assessments performed at the assigned participant.

l. Detail Assessment Report: A formal, written report used to describe and summarize assessment activities for a single $(CP)^2$ 2000 area.

m. Findings: Any non-compliance (documentation, compliance, or product) found during an assessment. All findings are described in detail on the detail assessment report forms.

n. Interested Parties: As used in this document, interested parties may include:

(1) personnel from the Major Subordinate Commands (MSC(s));

(2) the participant;

(3) the Contract Administration Service (which includes DCMC or other in-house government staff);

(4) prime Contractors;

(5) other Military Services;

(6) customers of the participant; i.e., Program/Project Managers, Program Executive Officers, prime suppliers, etc.;

(7) subject matter experts;

(8) Depots;

(9) Arsenals.

o. Leveraging: The use of other assessment data (from 3rd party ISO assessments/ certifications, Malcolm Baldridge awards, State awards, or Federal awards, etc.) to reduce the workload of the $(CP)^2$ $_{2000}$ assessment team and to lesson the impact of assessments on the participant.

p. Management Review: After certification, management reviews will be held at least annually to review metrics, continuous improvement efforts, customer concerns, etc. The management review may include limited assessments of all or selected areas.

q. Memorandum of Agreement: An agreement signed at the time of certification by the lead MSC, CAS (if applicable) and the participant's top management that delineates the continuing responsibilities of the signatories.

r. Observer: A non-voting member of the assessment team.

s. Participant: The organization (prime- or sub- contractor, depot, arsenal, etc.) seeking certification under this program.

t. Post-Certification Assessment: An assessment held after certification. Normally performed because of an indication of declining quality.

u. Product: All services, hardware, processed materials, items, materiel, materiel data, software, supplies, systems, assemblies, subassemblies, or portions thereof produced, purchased, developed, or otherwise used by DoD.

v. Revocation: Complete removal from the program of a previously certified organization.

w. Scope of Certification: Applies to the type of certification sought; i.e., production, design/development, maintenance, etc. Also used to describe the specific participant's organization to be certified; i.e., a production line, a single plane, multiple plants, etc.

x. Self-Assessment: An assessment performed by the participant using the $(CP)^2$ $_{2000}$ assessment areas.

y. Subject Matter Expert: Personnel who are assessment team members providing support in their field of expertise. Subject matter experts do not finalize findings.

z. Suspension: Temporary status during which a certified participant is allowed extra time to respond to post-certification assessment findings. If no response is received within the allotted timeframe, revocation of certification may follow.

1-4. METRICS

a. Each MSC will maintain $(CP)^2$ $_{2000}$ status IAW $(CP)^2$ $_{2000}$ Metrics. (Ref.. *Figure 1.*)

$(CP)^2_{2000}$ Participant Metrics

Quality Costs
Number of Requests for Deviation/Waiver (RFD/W) Submittals
Scrap, Repair, And Rework Percentages
Number of Quality Deficiency Reports (QDRS)
Number of Corrective Action Requests
Corrective Action Cycle Time
Number of Material Review Board (MRB) Actions
Vendor/Supplier Performance

$(CP)^2_{2000}$ Government Metrics

$(CP)^2_{2000}$ Certification Process Cycle Time
Cost Savings/Avoidance Achieved for $(CP)^2_{2000}$ Certified Participants
Total Number of $(CP)^2_{2000}$ Participants Certified
Total Number of $(CP)^2_{2000}$ Participants (counted when they commit)
Total Number of $(CP)^2_{2000}$ Post-Certification Management Reviews Conducted
Total Number of $(CP)^2_{2000}$ Assessments Conducted
Total Number of $(CP)^2_{2000}$ Participants Suspended or Revoked

Figure 1

Chapter 2

Assessor Qualifications And Information

2-1. GENERAL

a. The human area plays a critical role during the conduct of assessments. Although people conducting assessments cannot completely control the attitude and actions of personnel assigned to the facility being assessed, the assessors can greatly influence the relationship between the parties by acting in a professional manner. The intent of this chapter is to address some of the important factors that influence the human area.

b. An important element of acting professionally at all times is the recognition that reasonable people can have different opinions about a particular issue that often results in heated discussions. The ability to participate in these discussions while maintaining a distinction between professional disagreement and personal animosity is the mark of a true professional. It is also essential that people conducting assessments continually exhibit that trait to prevent a counterproductive adversarial relationship from developing between the parties involved in the assessment.

2-2. CONDUCT

a. Assessment team members must adhere to rigid ethical standards to preclude any question of credibility or objectivity.

b. Personnel conducting assessments must recognize that they are visitors, and should act as such with regard to abiding by the local rules and customary practices. This includes compliance with all safety regulations, working hours (to the extent possible), and lunch periods. The assessor must exhibit a great degree of tact and courtesy at all times during an assessment. Consideration must be made for the normal responsibilities and obligations of the personnel at the facility. The assessors must be flexible in their schedule and their demands for time from busy people. Above all, every effort must be made to avoid placing individuals in embarrassing positions.

2-3. TEAMWORK

a. This assessment methodology requires participation of personnel from the facility and is a major factor in promoting a teaming attitude on the part of both parties. Without a sense of teamwork, the chances that the assessment will be successful, including subsequent corrective action, are greatly diminished.

b. Both parties are striving for common goals and objectives. Actions that promote an adversarial relationship cannot be tolerated at any time during the assessment. If this happens, the assessment team leader and the participant's management must intervene. Remember that the purpose of the program is to help participants improve their quality system to become certified.

2-4. INDEPENDENCE

a. In all matters relating to the assessment work, the AMC MSC(s), participating organizations, and the individual assessors should be free from personal, external, and organizational impairments to independence. They should maintain an independent attitude and appearance. Impairments may be defined as follows:

(1) Personal impairments are those circumstances in which the assessor may not be impartial, or may not be perceived as impartial. These apply to individual assessors, but they may also apply to the assessing organization. Personal impairments may include, but are not limited to the following:

A. Official, professional, personal, or financial relationships that might adversely influence an assessor's objectivity and findings;

B. Preconceived ideas toward any aspect(s) of the organization being assessed;

C. Biases for or against any aspect of the organization being assessed.

(2) External impairments are factors external to the assessing organization that restrict the assessment or interfere with an assessor's ability to form independent and objective opinions and conclusions. An assessment may be adversely affected by such external factors as:

A. Interference or influence that improperly limits the assessment;

B. Unreasonable restrictions on time allowed for the assessment;
C. Interference in the assignment and appointment of assessment personnel;

D. Restrictions on funds or resources available that would adversely impact the assessment;

E. Authority to overrule or influence the content of the assessment report;

F. Influences that jeopardize the assessors continued employment for reasons other than competency or need for the assessor's services.

(3) Organizational impairments are generally those affecting the internal assessor's independence within the structure of the participating organization being assessed. To help achieve organizational independence, internal assessors should be:

A. Organizationally independent of the unit being assessed;

B. Sufficiently removed from internal political pressures to ensure their objectivity without fear of repercussions;

C. Free to report objectively, even to internal top management.

b. It is the responsibility of AMC MSC's, participating organizations, and the individual assessors to maintain independence so that opinions, conclusions, judgments, and recommendations will be impartial and will be viewed as impartial by knowledgeable third parties.

c. Assessors should consider not only whether they are independent, but also whether there is anything about their situations that might lead others to question their independence. All situations deserve

consideration because it is essential not only that assessors are, in fact independent and impartial, but also that any knowledgeable third parties would consider them so.

d. All assessment team members need to consider the three general classes of impairment to independence mentioned above- personal, external, and organizational. If one or more of these impairments to independence affects an assessor's ability to perform the work and report findings, that assessor should decline to perform the assessment. Recognizing there may be situations where the assessor performs the assessment, the impairment(s) should then be reported in the assessment report. Also, when assessors are employees of the participant organization, that fact should be reflected in the assessment report.

2-5. COMMUNICATIONS

a. One of the most valuable tools of an assessor is effective communication in transmitting ideas and recommendations, as well as receiving information from others. A few personal attributes that contribute to good communications are provided in the following paragraphs.

b. Avoid confrontation. It is helpful to maintain an open mind, even though agreement with certain statements may not be possible at the time. Arguments lead to a contest of personal wills, and preclude further exchange of information that could possibly lead to mutual consensus and understanding. Maintain a positive attitude and try to limit discussions to factual information rather than conjecture or personal opinions.

c. The assessor needs to be a good listener. Assessors must pay attention to conversations, minimize their own talking, and avoid dominating the discussion. All written or verbal information must be carefully studied for hidden messages or meaning. Avoid any distractions to the free flow of information.

d. Assessors must have a clear understanding of any situation prior to making judgments or evaluation. Avoid making value judgment comments.

e. The final measure of success of any assessment is the manner in which necessary corrective actions are completed. This depends on the degree the participant is convinced that the actions are necessary. The assessors should play a major role in convincing all parties that any shortcomings noted during the assessment must be corrected and point out the benefits to be realized once the shortcomings are resolved.

f. One of the poorest method to motivate a participant to correct a shortcoming is to say: "It has to be done that way because $(CP)^2$ 2000 requires it to be done that way." While that may be true, it is not likely to be a strong motivator to the participant. It is far more effective to explain the benefit associated with the change.

g. The assessor should point out that most corrective actions necessary to resolve shortcomings noted during assessments will ultimately reduce costs, waste, late deliveries, and be a major factor in any particular participant remaining competitive. This line of discussion is a powerful appeal to the personal pride and prestige of the people who must receive the information pointing out the need for change.

2-6. QUALIFICATIONS

a. The staff assigned to conduct the assessment should collectively possess adequate professional proficiency for the tasks required. Therefore, assessors shall be trained and have a thorough knowledge in assessment techniques, quality standards, and, where possible, the specific or unique environment in which the assessment is conducted.

b. Qualifications for assessors conducting the assessment should include;

(1) Knowledge of the methods and techniques applicable to perform an assessment, with the education, skills, and experience to apply such knowledge to the assessment being conducted;

(2) Skills to communicate clearly and effectively, both orally and in writing;

(3) Skills appropriate for the assessment work being conducted;

(4) Skills to interpret program objectives, assessment areas, and feasibility of achieving them.

c. Assessors are also encouraged to obtain professional certifications such as: American Society for Quality (ASQ) Certified Quality Assessor (CQA), or Certified Quality Engineer (CQE); or Registration Accreditation Board (RAB) Quality Management Systems Auditor, or Quality Management Systems Lead Auditor. Subject matter experts are encouraged to have formal assessment training, however, without formal assessment training may participate in an assessment when accompanied by a trained assessor.

Chapter 3

Certification Process

3-1. PRE-ASSESSMENT

a. Once a potential participant initiates the request for information and possible participation in the program the following activities will occur:

(1) The contacted MSC will issue an information package and letter to the participant. The letter will include instructions for requesting an introductory briefing and will request both a participant POC, local CAS representative, and a list of all current government contracts, including the procurement agency for those contracts. The letter will enclose an information package consisting of: the AMC $(CP)^2$ $_{2000}$ website address; the $(CP)^2$ $_{2000}$ brochure; AMC Pamphlet 715-16; and these guidelines.

(2) The contacted MSC will determine if other MSC(s) have contracts with this participant and if so, a "lead" MSC will be determined through negotiations with all involved MSC's. The lead MSC will serve as the single point of contact with the participant throughout the program. The lead MSC will assign a $(CP)^2$ $_{2000}$ POC, who will be responsible for assuring all activities are performed and are timely.

(3) Upon receipt of the request for the introductory briefing, the $(CP)^2$ $_{2000}$ POC will begin briefing preparation. All interested parties will be invited to participate in the briefing. Local area certified participants might also be invited. As appropriate, the $(CP)^2$ $_{2000}$ POC will coordinate/notify/invite upper management. A letter confirming dates and attendees will be forwarded to the participant.

(4) Present briefing, using core briefing charts. MSC(s) may tailor to add other command specific information. (Refer to Technical Assistance Para 3-2.)

(5) Subsequent to the introductory briefing, the $(CP)^2$ $_{2000}$ POC will forward a letter to the participant requesting management commitment to participate in the program. The letter shall request the participant:

A. Determine the scope of the certification in consultation with the Government. The scope can be a Production and/or a Design/Development certification;

B. Commit to a date for providing the formal self-assessment. The self-assessment will be documented and a self-assessment summary, along with a corrective plan and the documented quality system will be provided to the lead MSC;

C. Commit to a goal of one year or less for certification.

(6) The $(CP)^2$ $_{2000}$ POC will verify all applicable MSC(s) concur with the definition of the scope and entities (facilities) to be certified before the assessment phase starts.

(7) The $(CP)^2$ 2000 POC will canvas the participant's customers and local CAS representative for an evaluation of the participant's past performance.

3-2. TECHNICAL ASSISTANCE

a. Various forms of technical assistance may be provided as appropriate, to assist the participant throughout the $(CP)^2$ 2000 process. The following tools/techniques are available:

(1) Technical (mid-management) Briefing: Ideally this would immediately follow the formal upper management briefing, however it may occur at any time prior to the assessment. It would consist of more detailed information about the actual assessment process for the working level. It could include an assessment demonstration to assure that the participant understands the scope and depth of a $(CP)^2$ 2000 assessment, and to allow the participant to experience the assessment methodology. This may be beneficial to a participant who has specific questions or who has not been involved in an assessment.

(2) Documentation Review: A spot-check of documentation for several areas. The review may occur any time after commitment and before the assessment. This may be accomplished at the work site or at the participant's facility. This review indicates whether the participant is on the right track. This could be beneficial for a participant who is initially writing procedures. It is intended to provide the participant with basic guidance, not to write the procedures for them. This is not to be confused with the complete documentation review that is conducted during the assessment.

(3) Gap Analysis: A pre-assessment visit to the participant's facility to assure full understanding of the scope and depth of the upcoming assessment and to allow the participant to experience the assessment methodology prior to an assessment by the full team. This would be limited to one or two specific elements or areas, at the discretion of the team leader. This may also be beneficial to a participant who is already registered to a quality system and wants to gauge the level of work remaining to meet the $(CP)^2$ 2000 areas.

(4) Documentation and methodology for the above, will be IAW this document.

3-3. SELF-ASSESSMENT

a. An important phase of the $(CP)^2$ 2000 process is the participant's performance of a detailed self-assessment. If the self-assessment is performed properly, it will assist the participant in:

(1) Completing the certification in 1 year or less;

(2) Becoming knowledgeable of the $(CP)^2$ 2000 areas;

(3) Becoming aware of their system weaknesses early in the process. This permits the participant to get a head start in implementing the needed corrective action.

b. The team leader should encourage the participant to utilize the AMC worksheets for their self-assessment. Upon the review of the self-assessment the team leader will:

(1) Determine if the participant is prepared for the $(CP)^2$ 2000 baseline assessment; and subsequently use this self-assessment as the basis for scheduling the baseline assessment.

(2) Determine if the participant needs technical assistance.

(3) Use the self-assessment as a road map for the baseline assessment

c. This early communication with the participant should ensure that the detailed self-assessment includes:

(1) The participant's self-rating (0-10) of each area (Ref. *Figure 2*);

(2) For each $(CP)^2$ 2000 worksheet question, a cross-reference to the participant's 1st tier, 2nd tier, and 3rd tier documents (if applicable);

(3) A copy of the quality assurance manual(s) (or equivalent) and one or two examples of the participant's 2nd and 3rd tier documents (if applicable).

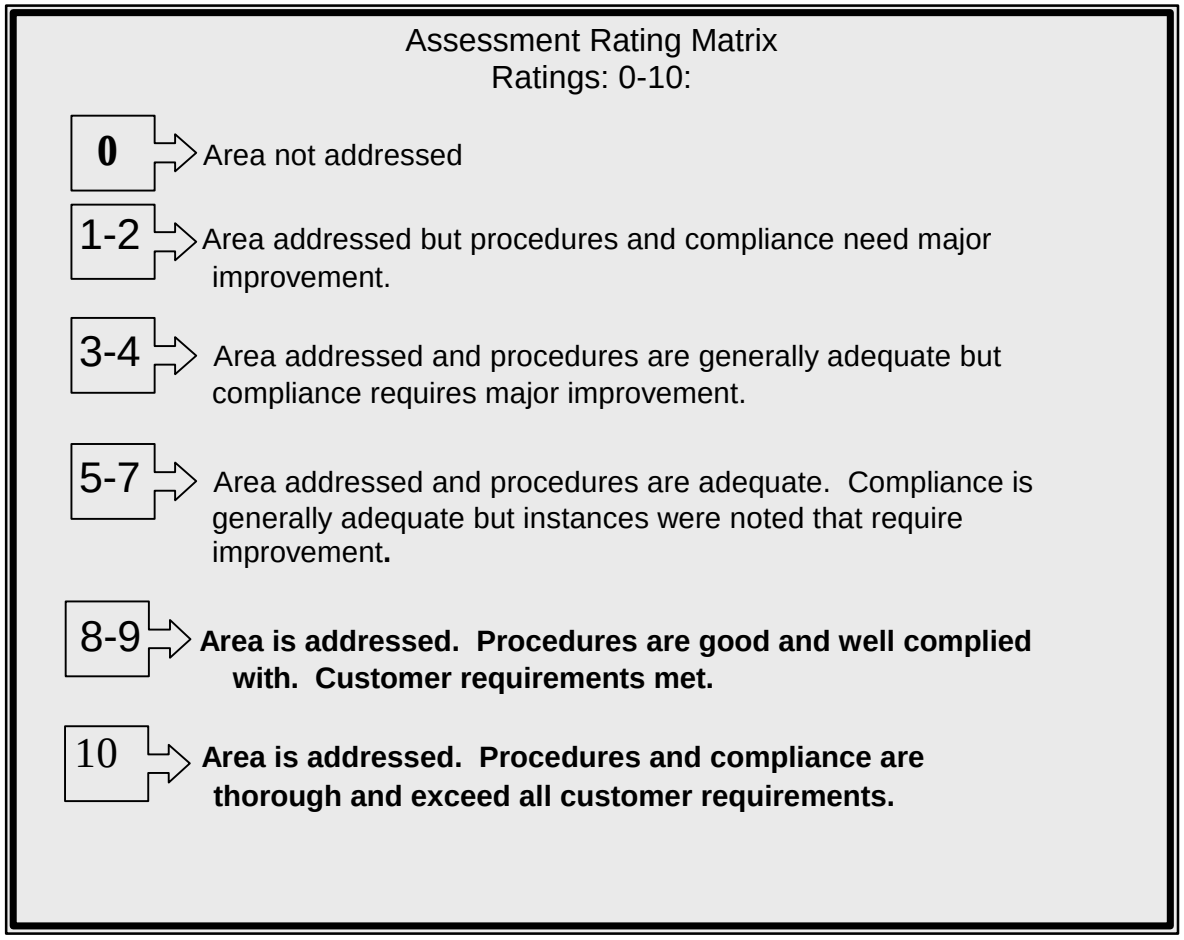

Figure 2

3-4. ASSESSMENTS

3-4.1. SCHEDULING ASSESSMENTS

a. The assessment phase commences with the completion of the participant self-assessment and all corrective actions generated during the self-assessment.

b. Once the $(CP)^2$ 2000 POC has formally accepted the corrective actions generated during the self-assessment, the $(CP)^2$ 2000 POC will contact the applicable personnel at the participant's facility to arrange a mutually acceptable schedule for the assessment, leaving sufficient time for inviting all interested parties (30 days). At this time the $(CP)^2$ 2000 POC should arrange to receive the participant's quality assurance manual (or equivalent), second-tier procedures, and SPC plan as a minimum (if not done previously). Every effort should be made to review as much of the participant's documentation as possible before the assessment.

3-4.2. INVITATION OF INTERESTED PARTIES

a. Once a date for the assessment is scheduled, the $(CP)^2$ 2000 POC will invite all interested parties to participate in the assessment. Invitations should be sent out at least 30 days prior to the assessment.

3-4.3. ASSESSMENT PLANNING

a. The $(CP)^2$ 2000 POC should obtain information concerning the size and location of the participant's facility, number of employees, number of production lines, types of product/services provided, number of buildings, etc. This facilitates pre-assessment planning concerning the necessary size of the assessment team, length of the assessment, etc. The $(CP)^2$ 2000 POC should consider the resources available to a participant when planning the assessment; i.e., smaller participants may not be able to provide as much support as larger participants.

b. The team leader will coordinate with the participant to determine if any data from other assessments can be leveraged, thereby maximizing use of existing resources (government and participant). Examples of assessment data that may be leveraged are: 3rd party ISO registrations, Malcolm Baldridge award, State awards, or Federal awards, etc. If the participant concurs, the team leader will obtain assessment reports, working papers, final assessment reports, etc., and review this data to determine if the scope and depth of the assessments performed and their sufficiency to warrant application of the leveraging guidelines (Ref. *Figure 3*).

Leveraging Guide (Matrix)

Areas	Definition	Leveraging Guidance
1	Management Responsibility	High
2	Quality System	Low
3	Contract Review	Low
4	Design Control	High
5	Document and Data Control	High
6	Purchasing	Low
7	Control of Customer-Supplied Product	Low
8	Product Identification and Traceability	Low
9	Process Control	High
10	Inspection and Testing	High
11	Control of Inspection, Measuring, and Test Equipment	High
12	Inspection and Test Status	Low
13	Control of Nonconforming Product	High
14	Corrective and Preventive Action	High
15	Handling, Storage, Packaging, Preservation, and Delivery	Low
16	Control of Quality Records	Low
17	Internal Quality Audits	High
18	Training	Low
19	Servicing	Low
20	Statistical Techniques	Low
21	Customer Satisfaction	High
22	Quality Costs	High
23	Warranty Performance	Low
24	Ethics	Low
25	Business Planning	Low
26	Safety	High
27	Environmental	Low
28	Continuous Improvement Process	High

Notes:
1. Areas with a criticality rating of high, typically will not be leveraged, but will be fully assessed.

2. Areas with a criticality rating of low will be leveraged to the maximum; however, the $(CP)^2$ $_{2000}$ specific questions will always be assessed.

3. The extent that each area will be leveraged will be at the team leader's discretion, based upon review of provided documentation.

Figure 3

c. Once the assessment team is established, the $(CP)^2$ 2000 POC can assign assessment areas to sub-teams (or individuals). Assignments should be made known to the team members as soon as possible so they can adequately prepare for their part in the assessment. Provide the list of assessment team members to the participant at least 10 days prior to the assessment.

d. $(CP)^2$ 2000 POC should contact the participant prior to the assessment to make arrangements for a meeting area or conference room for the assessment team, clerical support if necessary, and office automation; i.e., phone lines for modems, printers, etc.

e. The $(CP)^2$ 2000 POC will coordinate with the participant to establish a time and place for the in-brief. This briefing should take place as early as feasible on the first day of the assessment. The team leader should coordinate with the POC at the participant's facility to ensure the in-briefing is attended by: senior management, participant personnel who will be on the assessment team, and any other participant personnel so designated by senior management. Considerations include: number of attendees, adequate room size, availability of overhead projector and/or computer support (if required), etc.

3-4.4. ASSESSMENT TEAM MEETING

a. Either before or after the in-brief, the team leader should hold a meeting with the assessment team to assure that all team members understand their assignments and the methodology to be used during the assessment.

b. The team leader should briefly discuss the forms to be used, times and places for the daily meetings, and address any questions or concerns that the team members have.

3-4.5. IN-BRIEFING

a. The purpose of the in-briefing is to:

(1) Review the scope and objectives of the assessment to ensure all understand its purpose.

(2) Establish the communication links between the assessment team and participant.

(3) Introduce the assessment team to the participant's management and obtain an attendance list.

(4) Confirm that the resources and facilities needed by the assessment team are available.

(5) Provide a short summary of the standards, methodology, and teaming concept.

(6) Confirm the timeframe for the assessment, including team-only meetings and participant briefings.

(7) Establish the time and date for the exit briefing.

(8) Discuss the assessment report, follow-up actions, and commitment to confidentiality.

(9) Clarify any details concerning the assessment.

3-4.6. ASSESSMENT ACTIVITIES

a. The major purpose of the assessment is to evaluate whether the participant's quality management system will ensure that only highest quality, conforming product or services are provided to the Government. Evidence of compliance to requirements should be collected through interviews, examination of documents and records, inspection of product, and observation of activities and conditions in the areas of concern; e.g., manufacturing area, receiving area, calibration lab, administrative offices, etc. Inspection activities may include hands-on visual and dimensional inspections, testing or witnessing testing of product including salt-spray tests, tests of phosphate coating weights and paint thickness; chemical/metallurgical/electrical/electronic testing, ballistic firing tests, etc.

b. Evidence suggesting nonconformance should be investigated if it seems significant, even if this evidence is not addressed in the assessment areas. The assessor should attempt to confirm information gathered through interviews by acquiring the same information from other independent sources, such as physical observation, measurements, and records.

c. Assessors must keep the team leader informed of all deficiencies identified during the assessment. The participant's representative to the assessment team should be made aware of any deficiency and be a part of its investigation. Any safety-related deficiencies, including product critical defects, must be brought to the team leader's attention immediately. The assessor can inform the team leader of non-safety related deficiencies during the daily meetings.

d. During the assessment, the team leader will review the progress of each assessor or assessment sub-team to ensure the schedule is being met. The team leader may make such changes to the assessors work assignments and to the assessment plan as is necessary to ensure completion of the assessment.

e. Meaningful or valuable participant metrics are encouraged for all areas, and will be agreed upon with the team leader at the time of the assessment. At a minimum, the participant is required to maintain the metrics referred to in Para. 1-4.

f. Each assessor or assessment sub-team will complete working papers, Assessment Deficiency Reports (ADR(s)), and Detail Assessment Reports (DAR(s)), as required. The working papers include the assessment forms utilized and all forms or papers used to record notes about individual findings. All the above documents will be turned into the team leader at the conclusion of the assessment or as otherwise directed by the team leader.

g. An ADR will be used to record all the assessment findings generated for each $(CP)^2$ 2000 area. Depending on whether the individual findings are related to each other or not, single or multiple Adds may be issued. Each ADR should contain sufficiently detailed information to enable the participant to fully understand the finding. Each finding should state the observed situation objectively and reference any document that provides evidence of the nonconformance. Whenever possible, the finding should be witnessed by a participant representative.

h. A DAR will be used to describe and summarize assessment activities for a single $(CP)^2$ 2000 area.

i. The detailed assessment areas are contained in Chapter 5. The assessment team will use these areas as a guide. The depth and breadth of the assessments may vary. For this reason, skilled assessors with the appropriate background experience will be used to determine the detail of assessment necessary. All quality product (or service) requirements; e.g., contract, technical data package, applicable military specifications and standards, environmental requirements, etc. are subject to the assessment.

j. Each assessor or assessment sub-team will recommend a rating for each area (Ref. *Figure 2*). The team leader is responsible for assigning the final area rating.

3-4.7. DAILY MEETINGS

a. Team-only meetings: The assessment team will meet at the end of each day to discuss the deficiencies identified, assure the assessment is on-schedule, and advise the team leader on the assessment's progress. Each assessor will briefly describe the areas they have reviewed, objective evidence of compliance to these areas, and any deficiencies or evidence of deficiencies. Since deficiencies in one area can often affect other areas, the rest of the assessment team will review their findings against the findings of their team members, suggest any additional areas requiring review, and assure the overall assessment is a coordinated effort. The team leader will make any reassignments or other changes necessary to complete the assessment on schedule.

b. Meetings with the participant: The team leader will brief the participant's designated personnel each morning (or at other agreed upon times) on any deficiencies identified by the assessment team. The participant will be advised that he can provide additional information on the deficiency any time throughout the assessment. The team leader and applicable assessors will consider that information as time permits. The team leader can designate additional assessors to assist in this briefing when an issue is complex or as determined necessary.

3-4.8. EXIT BRIEFING

a. At the end of the assessment, the assessment team will meet with the participant's senior management, those involved in the assessment, and others identified by the participant. The main purpose of this meeting is to present the assessment findings to the senior management in such a manner as will ensure they clearly understand the results of the assessment. This exit briefing should contain no surprises for the participant as the findings should have already been fully discussed at the daily briefings.

3-4.9. ASSESSMENT REPORTS

a. Timeframes: A goal is to provide the assessment reports to the participant within 15 days after completion of the assessment. Detailed information regarding the assessment reports is contained in Figure no. 4.

b. Distribution: Assessment reports will be distributed to the participant, CAS (if applicable), and all MSC(s) and customers participating in the assessment. The cover letter to the assessment report will state the report may contain proprietary information and cannot be copied or distributed further without the written approval of the assessment team leader.

c. Appropriate channels will be provided information regarding contractual or safety related discrepancies under separate correspondence. At a minimum, contractual or safety discrepancies will be reported to the Procuring Contracting Officer or Program Manager for the affected products and to the customer. Safety discrepancies will also be reported to the applicable Safety Office or OSHA immediately.

The assessment report will be an enclosure to a cover letter from the MSC to the participant. Copies of the cover letter and assessment report will be furnished to all assessment participants. The cover letter will state the report may contain proprietary information and should be handled accordingly.

The format of the assessment report will be as follows:

Section I. General Assessment Information
- Participant
- Location and Dates of Assessment
- References used during the assessment
- Assessment Team personnel

Section II. Introductory Information
- Purpose
- Scope
- Information on the pre-assessment visit (if applicable)
- Information on the pre-assessment planning and document review (if applicable)

Section III. Abstract

Section IV. Assessment Details.
- Assessment Rating Summary Report
- Detail Assessment Reports

Section V. Team Leader Analysis

Section VI. Appendices
- Participant's Organizational Chart (optional)
- Listing of Product Lines (optional)
- Assessment Team Roster and Assignments
- Points of Contact
- In-Briefing Charts (optional)
- Exit Briefing Charts (optional)

Figure 4

3-5. CORRECTIVE ACTION AND FOLLOW-ON REVIEWS

a. Corrective actions will be reviewed either on-site or off-site. Reviews will validate implementation of effective corrective actions on noted deficiencies. An on-site review will be scheduled if deemed appropriate by the team leader, depending on the nature and severity of the findings, etc. These on-site reviews may include further assessment of the deficient area or other areas at the team leader's discretion. Local Government representatives may be utilized to verify corrective actions.

b. The cycle of corrective action reviews will continue until all areas have received a satisfactory rating of at least 8 (Ref. *Table 2*), or only minor corrective actions are required which will be implemented prior to certification.

c. If the original one-year certification goal or another participant agreed-upon milestone goal for certification has not been met, then a follow-on assessment may be necessary. The extent of the assessment

would be at the team leader's discretion based primarily on the time lapse between the baseline assessment and completion of all corrective actions.

3-6. RECORDS

a. Responsibility: All internal and external $(CP)^2$ 2000 records will be maintained and controlled by each MSC(s) custodian to assure confidentiality. Access to all records will be restricted based on a demonstrated need to know.

b. Duration: All records will be maintained throughout the life of the certification.

c. Record Types:

(1) Internal: Assessment results or working papers; e.g., check sheets, corrective action requests, assessment reports, original observations, calculations, data, etc.

(2) External:

A. Letters received from a participant relative to the $(CP)^2$ 2000 program;

B. $(CP)^2$ 2000 assessment related material (corrective action plans, metrics, etc.);

C. Certification Letters and Certificates of Registration;

D. $(CP)^2$ 2000 Memorandum of Agreements (MOA(s));

E. Suspension and revocation documents;

F. Appeals, disputes, complaints;

G. Participant provided data and information acquired during assessment.

d. Storage/Location. Ensure that records are maintained in a secured location. These files shall be locked after normal business hours. Access to these records shall be limited.

3-7. RECOMMENDATION FOR CERTIFICATION

a. The team leader is responsible for making a recommendation to the appropriate MSC $(CP)^2$ 2000 manager regarding certification. The team leader does not make the final decision regarding certification, therefore is prohibited from informing the participant regarding their certification status. Corrective actions for noncompliance's must be completed by the participant and verified by the government prior to certification. When the MSC manager has determined that the participant is eligible for certification, the team leader will:

(1) Obtain concurrence from all assessment participants, as appropriate. Concurrence is not required if other MSC(s), CAS, or a customer were asked to participate in the assessment, were given at least thirty days notice prior to the assessment, and chose not to participate.

(2) Provide the necessary information to the appropriate MSC responsible for obtaining the plaque and flag to be presented during the certification ceremony. This information should include the participant's name, facilities being recognized, location, and date of ceremony.

(3) Prepare participant's certification eligibility letter and forward through the appropriate management level to the participant.

(4) Prepare and coordinate the certification Memorandum of Agreement (MOA) with appropriate organizations to include both Government and participant.
(5) Coordinate with the lead MSC(s) Commanding General, the participant, and CAS (if appropriate) to schedule the certification ceremony.

(6) Upon signing of the certification MOA, the $(CP)^2$ 2000 POC shall notify the appropriate MSC(s), Product Quality Manager (PQM), appropriate management, etc. of the participant's certified status.

(7) The appropriate individual; e.g., PQM, who manages a contract with a certified participant shall, when reduced requirements are determined to be warranted and after obtaining concurrence from all affected customers, prepare a letter for the Procurement Contracting Officer's (PCO's) signature notifying the participant of these reductions. The letter to the PCO must state that all customers have concurred in the reduced requirements. A copy should also be provided to the $(CP)^2$ 2000 POC for the repository file.

(8) The $(CP)^2$ 2000 POC will monitor and document certified participant's compliance with the requirements of the certification MOA through post-certification assessments, Quality Deficiency Reports (QDRs), or other customer feedback, and the participant generated metrics.

3-8. DISENGAGEMENT OF INACTIVE PARTICIPANTS

a. A participant should remain active in $(CP)^2$ 2000. An active participant is one who demonstrates progress towards certification (e.g. by meeting established goals, submitting the self-assessment report, implementing effective corrective actions in a timely manner, etc.).

b. Participants who are not making satisfactory progress toward certification (e.g. repeatedly miss goals, are non-responsive, or are inactive for a substantial period of time) will be invited to reconsider their commitment. The $(CP)^2$ 2000 POC will initiate a letter to the highest official requesting the participant recommit or voluntarily withdraw. If no response is received within 30 days, the participant will no longer be considered in the program.

Chapter 4

Post-Certification Management

4-1. MANAGEMENT REVIEWS

a. The goal is to conduct these reviews on at least an annual basis. MSC upper management support is encouraged.

b. This management review is normally conducted through direct (face to face) discussions; however, it can be accomplished through electronic media. The participant will prepare an agenda that will minimally include: review of metrics prescribed by the MOA, any continuous improvement efforts, teaming efforts, and other significant efforts that contribute to the participant's quality system. Other topics can be added as required. The management reviews may include limited assessments of all or selected areas, including inspection of product. The review is to assure the participant continues to meet all requirements and that upper management continues promoting $(CP)^2$ 2000. The extent of the review depends on many variables, such as: participant's ability to support the review (contract size, etc.), customer or CAS concerns, quality indicators, and data trends.

c. Participation: The $(CP)^2$2000 POC will invite the interested parties consistent with the executive level of management of the certified participant facility. A letter for input to the review by all interested parties shall be initiated at least 30 days prior to the review and can serve as notice of the review. Sufficient time must be allowed for the participant to address this additional input.

d. $(CP)^2$ 2000 Score Card: At the conclusion of the management reviews, a $(CP)^2$ 2000 score card will be provided to AMC, participates, and all interested parties indicating the participant's $(CP)^2$ 2000 status.

4.2. POST-CERTIFICATION ASSESSMENTS

a. MSC(s) reserve the right to perform post-certification assessments at the certified facility.

b. Post-certification assessments shall be considered when any of the following occur:

(1) Significant changes of management or product line;

(2) Continuous improvement efforts deteriorate;

(3) Loss of process control;

(4) Customer(s), CAS, or company self-assessments note major discrepancies;

(5) Excessive customer complaints and inadequate response;

(6) Product safety problems are identified;

(7) Delinquent deliveries;

(8) Administrative Contracting Officer (ACO) issues a method "C" corrective action request;

(9) Degradation of product quality is eminent or has occurred;

(10) Bankruptcy has been declared, etc.

4-3. WITHDRAWAL and DE-CERTIFICATION

a. Withdrawal: The participant, CAS, or the lead MSC can withdraw from $(CP)^2$ 2000 at any time for any reason.

b. De-Certification: The revocation process may include a suspension followed by revoking certification if circumstances warrant.

c. Suspensions: Certification may be suspended if the participant is under indictment for fraudulent, unethical, or illegal activities. Suspension may also occur if corrective actions required by post-certification assessment or management reviews are not adequately addressed within 60 days. The lead MSC will issue a letter of suspension to the participant, which forbids further use of, or reference to, their certification, flag, or plaque, and rescinds all incentives and benefits. The reinstatement of certification may be accomplished if approved corrective action is completed, implementation is verified, and agreement between all interested parties is documented.

d. Revocation: If corrective action is not implemented within a maximum of 60 days from suspension, the certification may then be revoked. Once revocation has occurred, the participant can only regain certification by repeating the $(CP)^2$ 2000 process or portions of the process as documented and agreed to. Revocation may also occur when the participant has engaged in fraudulent, illegal, or unethical activity.

Chapter 5

Assessment Areas

5-1. GENERAL

a. This chapter addresses the areas within the participant that the assessment team will review. Typical assessment criteria is provided for the assessors general guidance. Detailed assessment criteria specific to a particular facility, process, or technology will be developed by the lead MSC. Further, it must be recognized that every metric may not apply at every facility. The assessment team will be responsible for determining applicability of all matrix utilized.

5-1.1. MANAGEMENT RESPONSIBILITY

a Quality policy. The participant shall maintain a well defined documented policy, establishing objectives and commitment to quality. Policies shall be implemented, maintained, and understood through all levels of the organization.

b. Organization. The responsibility, authority, and the interrelation of individuals who manage, perform, and verify the quality of the process shall be defined and provided organizational freedom to: 1) initiate action to prevent the occurrence of product non-conformance; 2) identify and record product quality problems; 3) initiate, recommend, and/or provide resolution through designated means; 4) confirm the implementation of solutions; 5) institute further processing controls of non-conforming product until correction has occurred to remove the deficient indicators from the product

c. Verification resources and personnel. The participant being assessed shall have identified in-house verification requirements, provide resources, and assign trained personnel for the performance of the verification activities, which include but are not limited to inspection, test, design control, production, installation and servicing of the process and/or product. Design reviews and internal assessments shall be performed by individuals independent of those directly responsibility for the verification and control of the quality system, processes, and/or product

d. Management representative. The participant shall maintain a management representative who will have the defined authority and responsibility to ensure the requirements of the their quality program are implemented and maintained.

e. Management review. The participants adopted quality system, shall be reviewed at appropriate intervals by the participants management to ensure its continued suitability and effectiveness. Proper management documentation shall be maintained covering these reviews.

f. A total quality management philosophy shall exist as evidenced by: Senior managers have visibly demonstrated commitment to continuous improvement. Resources are available for quality improvement

activities. Employees at any level can submit quality improvement ideas. Review, disposition, and implementation of employee suggestions is documented and maintained. Teaming of employees is utilized to solve problems and improve processes. Teams actively meet and record results. Teams include employees from all levels of the organization. Success stories and lessons learned are documented and shared.

5-1.2. QUALITY SYSTEM

a. The participant shall establish and maintain a documented quality system. The system will be designed to provide proper assurance that product conforms to specified requirements. This shall include, but not be limited to: 1) documented quality system procedures and instructions; 2) effective implementation of the documented quality systems procedures and instructions. Consideration should also be given to the following: 1) development of quality plans and manual in accordance with specified requirements; 2) identification and acquisition of controls, processes, inspection equipment, fixtures, production resources, and required skills to assure required quality; 3) when necessary updating of quality control, inspection, and testing techniques, which includes the development of new instrumentation; 4) identification of measurement requirements involving capability which exceeds the known state of art, allowing adequate time for the capability to be developed; 5) clarification of acceptability for all features and requirements, including those containing a subjective element; 6) compatibility of the design, production process, installation, inspection and test procedures, and any other applicable documentation; 7) identification and preparation of quality records.

b. Policies, responsibilities and functional interrelationships for the quality process must be defined. Specific functions, products, and processes must be evident.

5-1.3. CONTRACT REVIEW

a. The participant shall establish and maintain procedures for contract review and for coordination between internal functions.

b. Each contract issued from the participant shall be reviewed to ensure that: 1) requirements are adequately defined and documented; 2) requirements that differ are resolved; 3) the supplier of the materiel procured has the capability to adhere to the contractual requirements. Records for these contract reviews shall be maintained by the participant.

c. The contract review activities, interfaces, and communications within the participant should be coordinated with the sub-contract organization.

d. The participant shall establish a process to assure that effective contract review/initial quality planning occurs. The process will ensure that the appropriate functions (engineering, quality assurance, program management, manufacturing, and procurement) have an opportunity to review the contract. Each functional element shall have reviewed the contract for capability to meet the contractual requirements. Upon completion of contract review, any areas requiring clarification shall be referred back to the customer. Records of all reviews and customer clarification shall be maintained. The participant's system shall contain a provision for additional review if the contract is changed.

5-1.4. DESIGN CONTROL

a. General. The participant shall prepare and maintain documented procedures for controlling and verifying product design to ensure requirements are met.

b. Design and Development Planning. The participant shall establish plans for each design and development activity. These plans shall describe or reference these activities. Responsibility for implementation shall be defined and assigned to qualified personnel. Adequate resources shall be provided. The plans shall be updated or revised as the design evolves.

c. Organizational and Technical Interfaces. Interfaces between all disciplines/groups having input into the design process shall be defined. All necessary information shall be documented, transmitted, and regularly reviewed.

d. Design Input. All design input requirements shall be identified, documented, and their selection reviewed by the supplier for sufficiency. Any requirement problems shall be resolved with those responsible for their imposition. Design input shall consider any contract review activities and their results.

e. Design Output. Design output shall be documented, verified, and validated against design input requirements. Design output shall: 1) meet design input requirements; 2) contain or refer to acceptance criteria; 3) identify crucial design characteristics regarding the safe and proper functioning of the product. Design output shall be reviewed before release.

f. Design Review. As appropriate, formal, documented design reviews shall be planned and conducted. All functions concerned with the design stage under review shall be represented, as well as other specialist personnel, as needed. Review records shall be maintained.

g. Design Verification. As appropriate, design verification shall occur to ensure design output meets design input requirements. These measures shall be recorded.

h. Design Validation. Design validation shall be conducted to ensure the product meets user needs and/or requirements.

i. Design Changes. Authorized personnel shall identify, document, review, and approve all design changes and modifications before their execution.

j. Design Control. Generally, military designs are technically complex projects requiring diverse assemblies such as mechanical, electronic, hydraulic, explosive, and analytical systems, to work together in the right place, at the right time for success. Even the simplest hardware is usually expected to perform in a wide variety of environments and to interface readily with other equipment.

The design process for such equipment demands a sound background of information, techniques, standards, procedures, and resources in conjunction with a sound management organization to drive the program.

In order to investigate the existence of such a background, the way is open to measure and establish confidence in a participant's technical and organizational abilities against some form of benchmark criteria. This section outlines, in narrative form, the minimum assessment criteria expected from a participant seeking certification.

Significant "up front" design tasks such as design reviews, engineering test, configuration control, policies and procedures, failure analysis and corrective action, design planning, producibility, reliability, standardization and specification, and their integration are considered to be essential areas for review. However, many other activities such as authorization, amendment, drawing numbering, and recall can also influence quality on the shop floor and subsequent design decisions. Therefore criteria covering these tasks are applicable right across the design through production process.

Metrics, or some other means, that the participant may use to measure their progress should be initiated.

In the course of reviewing the participant's measures to assure quality in design, the assessment team will be able to consider the appropriateness of techniques and methods used by the design organization. The Government does not seek to impose methods of working, but will need to be satisfied that the participant's design organization is at least: 1) strongly supported by management that understands and uses the collective strengths of staff; 2) recruiting, training, and motivating the right type of people; 3) providing up-to-date design aids, tools, test and evaluation support facilities; 4) interfacing well with the customer and user; 5) communicating well with other groups within the organization and removing barriers to the questioning of decisions; 6) cultivating a team approach - " Concurrent Engineering," "life cycle" teaming, and Integrated Product and Process Development (IPPD); 7) maintaining close contact with manufacturing operations; 8) planning for transition from development to production; 9) operating a system to feedback information on past mistakes and successes; 10) anticipating problems for which timely solutions must be found; 11) individually developing and testing subassemblies/ subsystems of complex designs; 12) extensively testing systems integration; 13) establishing priority of customer requirements; 14) allocating cost, reliability, and performance goals to subassemblies; 15) employing a means of terminating nonproductive design approaches; 16) carefully analyzing failures and feeding lessons learned back into the design process.

The assessment team will seek confidence that the participant: 1) maintains adequate organizational structure; 2) has an able, suitably qualified, and experienced staff; 3) has or has access to the technical, test, and research facilities that are necessary to support the design effort in the field of military hardware/software; 4) is managed efficiently and has effective policies and procedures to assure the achievement of quality in design.

k. Design Process Control. The participant should have a definitive process for design and development. This process must be repeatable, controlled, and practiced throughout the organization. Engineering policies, procedures, and practices shall provide guidelines and criteria to the design teams, and assure development of designs that optimize performance, producibility, and minimize cost. The policies, procedures, and practices need to address, as a minimum, the following: 1) the transition of customer requirements to design criteria and design planning; 2) Integrated Product and Process Development (IPPD); 3) producibility; 4) configuration management and control, including software; 5) an orderly phasing of the design process, and its inherent reviews, leading to system qualification and maturity; 6) software development, if applicable; 7) failure analysis and preventative/corrective action system; 8) Simulation, Test, and Analysis.

The participant shall have a methodology for measuring how well he is accomplishing the above tasks. This methodology should include the appropriate metrics, analysis required, and a mechanism for addressing any unfavorable trends.

l. Design Planning. The participant should initiate planning for design and development activities at the earliest practical stage in the contract. Contracts shall be reviewed to assure a sound understanding of requirements and there shall be a clear process for assuring that the participant and the customer are in agreement regarding the interpretation of requirements. The participant will be proactive in seeking clarification of unclear requirements and will strive to understand all design aspects that might adversely affect system performance. The contract shall also be reviewed to identify and plan for any special or unusual requirements.

Planning shall be coordinated and integrated throughout all design activities. Planning shall include a review of skills required for the effort to assure that the participant has adequate skills and experience, or identifies training required. Planning schedules should be frequently reviewed for updating based on current status, problems, corrective action report, and lessons learned. The participant should conduct long range planning, identifying critical paths, establishing specific goals and objectives, and investigate new methods or other opportunities for process and system improvement.

m. Technical Risk Management Effort. Risk Management is a systematic approach to a structured decision making process and provides analytical techniques for evaluating these decisions. A participant that truly supports a risk management philosophy has clearly established processes for implementation of these analytical management techniques. In today's environment of continuous process improvement, strategies for evaluating and measuring the impacts of these evolutionary changes must be managed and evaluated to determine the impacts, not only on the time it will take to accomplish any change (i.e., schedule impacts), but also on cost and performance.

The participant should have a risk management process to identify, track, evaluate, and manage their risk. This process should be an integrated approach, using various strategies to improve performance, reduce cost, and decrease schedule. Technical risk reduction tools may include tolerance analyses, stress analysis, finite-element analyses, de-rating, and sneak circuit analyses. The participant should support risk management by fully understanding the risk process, implementing the principles, and reporting the results.

A risk management process can be used to identify the critical path for program completion, to perform sensitivity analysis, and must be assessable. The process should contain the activities that are

necessary to manage risk and the relationships using the logical interdependencies between these activities. The participant should have a process and assign the resources to: 1) identify areas or items of risk; 2) determine the probability of each risk item; 3) determine the impact to the program should the risk become reality; 4) develop a risk mitigation strategy for each item indicated as necessary by its probability and impact; 5) continuously monitor the program to drop or add items for tracking as the program progresses or changes.

In addition, a mechanism should exist which ensures that key management officials are provided the risk information on a timely basis so that risk mitigation strategies may be implemented and program impacts eliminated or minimized. A formal methodology for estimating the risk associated with each activity must be defined with a documented assessment trail, in order to achieve the program goals. Risk management is a continual process that should be quantified in the terms of cost, time, and quality of work or performance. A world-class participant should have a history of the application of risk management techniques that are integrated into the facility philosophy.

n. Concurrent Engineering/Integrated Product and Process Development (CE/IPPD). The participant shall use a CE/IPPD approach throughout the design process. This approach should integrate all technical disciplines into a coordinated effort to meet performance, cost, schedule, and supportability requirements. The approach should also assure compatibility of all functional and physical interfaces. Design teams must address the total system life cycle from design inception through production and disposal. All engineering disciplines should be integrated into the design team. Disciplines include design, configuration management, producibility, test and verification, deployment and installation, operability, reliability, maintainability, survivability, quality, software engineering, support, training, human factors engineering, system safety, system security, and manpower and personnel integration (MANPRINT). The participant design teams should include customer and subcontractor personnel and/or input as necessary. Teams must have adequate resources and authority to perform the total system design effort.

o. Supplier Relationships. Supplier empowerment is critical to the success of a program during the development phase. Key suppliers should be incorporated into the overall program planning and development as early as possible so they can participate in design trade-off studies as well as the detailed design activities. The key suppliers should be integrated into the proposal preparation activities and contribute to the Concurrent Engineering or Integrated Product and Process Development (CE/IPPD) process early so that the full advantage of their product, system, and/or process knowledge can be derived. They should participate in the establishment of design parameters, risk management requirements, key characteristic and process identification requirements, and be given the responsibility to assure their performance requirements are met.

Suppliers used during the design/development phase should be subjected to the supplier selection and rating system for performance, history, and quality outlined in assessment area

5-1.6., Purchasing.

p. Design Trade-off Studies. The participant should use design trade-off studies. These direct the effort that provides for balanced product designs while considering cost, schedule, and performance. The trade-off studies should include consideration for the product, production processes, special tooling, special test and inspection equipment (ST/SIE), performance, and cost. The absolute requirements stated in the system specification form the baseline effort. However, design margins are needed for every requirement, and it is intended that the participant have the flexibility to address

how much margin is applied within the program constraints (cost and schedule). The bottom line is that the absolute requirements must define a system that meets the customer's needs, but every effort should be made to improve performance/cost/schedule within program constraints and/or identify elements which require additional resources.

Consideration of producibility and supportability during design trade-off studies are key elements of the Concurrent Engineering/Integrated Product and Process Development (CE/IPPD) concept. To be truly effective, these trade-off studies should identify alternative production processes and consider the economic loss functions (reference Taguchi methods) for each potential alternative. The design trade-offs should consider robust product designs, which are tolerant of the intended manufacturing, assembly, test, and usage environments. The studies should assist in selecting the overall design, which represents minimum life cycle cost within the program constraints.

The trade study process may include the following elements: 1) flow down the design trade-off study task requirements to the suppliers, and integrate key suppliers into the CE/IPPD process; 2) integrate the trade-off study effort into the CE/IPPD master plan (or equivalent detailed plan) identifying the participant's key events which support the milestone requirements; 3) conduct, document, and validate the trade-off studies which result in the product or ST/SIE designs; 4) provide the status of the trade-off studies and rationale for the trade-off study results at key events and milestones; 5) identify opportunities for additional product/process improvement which exceed existing program constraints of cost and/or schedule, but which could provide significant investment potential for system improvement (cost, schedule, and/or performance).

q. Process Identification and Control. The participant shall implement a process for identification of critical product characteristics and their design limits, the identification of critical production processes, and determination of their capabilities. The intent is to: 1) identify those characteristics of the design which most influence performance, supportability, and cost; 2) determine the production process(es) which best match the product requirements; 3) verify the capability of the process; 4) develop the required process control for production. The effort to fulfill many of these requirements will be accomplished by the design teams through design trade-off studies and other tools.

To minimize the risk associated with the transition from design to production and to control product cost and quality, it is essential to identify, and control critical production processes at the earliest possible point in the design effort. The identification of critical processes will start with the identification of critical product characteristics. Critical characteristics may include weight, reliability, accuracy, transportability, cost, availability, etc. Therefore, critical processes are those having the greatest impact on the components and subsystems that control the critical characteristics. Once critical component and subsystem requirements have been established, the participant must determine the capability of the processes controlling those characteristics. Control of the critical processes must be the focus of the participant's Statistical Process Control (SPC) Program. Process capability should be authorized through the use of Variability Reduction, Design of Experiments, and other methods.

It is essential that these requirements flow down to key suppliers whose products will impact the participant's attainment of critical characteristic requirements. Development and production specifications and drawings should reference critical product characteristics and their associated process specifications when available.

r. Variability Reduction (VR). The participant shall have a procedure for Variability Reduction. Variability Reduction efforts during development are intended to establish a process, which improves product quality and manufacturing processes. During the production phase, VR should continue to be used to improve process capability and product quality even after the baseline program requirements have been achieved. The primary purpose of the VR effort is to reduce production variability in order to provide a higher quality of delivered product and to enhance long-term supportability. The VR effort should start early in the design effort with identified critical processes, but not be confined to them. Initially in a VR effort the design team would identify candidate processes. These processes would then be evaluated for stability and capability followed by an assessment of potential improvements. The team should be empowered to assess and implement the potential improvements and be responsible for monitoring their effectiveness. Variability reduction efforts should be encouraged and/or required for suppliers/subcontractors whose processes have a significant impact on end item quality.

s. Prototype Manufacture. When the participant fabricates for information or is contracted to build design prototypes for testing against design requirements, the manufacturing and assembly processes should be as similar to the expected actual production processes as is possible.

t. Design Reviews. The participant shall have a process for design reviews. Formal design reviews shall be performed at defined intervals to assess areas such as: 1) mechanical and electrical design status; 2) performance; 3) physical and functional interchangeability; 4) use of standard component/processes; 5) configuration control; 6) reliability and maintainability; 7) testing; 8) software; 9) producibility including inspectability; 10) safety, security, etc; 11) design robustness.

An independent chairperson who has a high level of technical competence and expertise, but who has no direct responsibility for the work under review should head the review team/panel. Design review teams should be multi-discipline and will typically consist of: 1) engineering; 2) project management; 3) production; 4) quality assurance; 5) material control/purchasing; 6) safety; 7) the customer.

Even when reviews are internal and not driven by formal customer design reviews, the customer should be invited to participate. All design reviews shall be documented and any action items that are assigned shall be followed up.

u. Failure Analysis and Preventive/Corrective Action System (FAPCAS). A failure analysis and preventive/corrective action system that identifies and prevents defects is critical to support the design and engineering process. Key elements of the program are, as a minimum: 1) a process for reporting all defects and tests failures; 2) failure analysis to determine causal factors and process solutions; 3) implementation of corrective/preventive action; 4) documentation of findings for future design activities; 5) a modification as necessary of design process handbooks and support activities to eliminate use of processes that allow these defects to occur.

The process should be well established. It should provide for tracking and trending failure data and nonconformance data as well as assuring that corrective action is taken when appropriate analysis indicates it is warranted. The need for root cause corrective action is especially critical during the development phase when changes to the product design can be most readily effected. The data relating to nonconformance's and failures must be analyzed to determine root causes and assure there is no overall degradation in the participant's control over quality.

All hardware procured or built during design/development that have nonconformance's or have experienced test failures should be controlled per the procedures outlined in 5-1.13, Control of Nonconforming Material. The root cause corrective actions should be tracked per the procedures in 5-1.14, Corrective and Preventative Action.

The primary purpose of the FAPCAS system is to affect necessary design changes early in the development process in order to avoid more costly nonconformance's, design changes, and test failures during production

and fielding. This can only be accomplished using root cause analysis and verification of the effectiveness of prescribed corrective and preventative action.

v. Simulation, Test, and Analysis. A comprehensive simulation, test, and analysis effort is essential to assure that the end item meets all performance and supportability requirements with minimum technical and program risks. The participant should develop a master test plan that meets user and contractual requirements. Testing may include proofs of concept/exploratory testing, design support testing, qualification testing, acceptance testing, etc. Analytical support may include design of experiments (e.g., Taguchi), system simulation, virtual prototypes, etc. The test plan should define the required test methods and test objectives, identify the field support requirements, determine the necessary facilities, services, and equipment, establish data reduction and analysis requirements, and develop the overall schedule.

The test results and analyses should support the design approaches taken and conclusions reached. The results should also be available in advance of each major decision point in the program. Schedules should allow sufficient time for redesign and test when necessary, based on simulations and/or predictive analysis performed prior to test. Accomplishment of the above requires the participant to work closely with the customer. Open access to all test plans, data, analysis, and results by customer personnel is essential.

w. Software Development. The software development capabilities will be assessed against specific criteria such as, but not limited to, that derived from the Software Engineering Institute's (SEI) capability maturity model for software. For $(CP)^2$ $_{2000}$ certification all the applicable criteria must be satisfied.

If the participant has been certified to a particular software development criteria it shall be submitted to the Government prior to the Government baseline assessment. The Government will use both this certification and the participants self-assessment in its $(CP)^2$ $_{2000}$ assessment.

x. Additional Examples of Metrics for Design/Development. The following sample metrics may be used to measure various processes during design/development. The participant may choose an appropriate metric from this list or create a useful metric for their facility.

Efforts should concentrate on selecting the best metrics and aiming these to demonstrate comprehensive management and review of data, such that the results may be used convincingly to indicate trends and progress in quality design improvement.
Approaches used to ensure validity and consistency of data will be described by the participant along with method of review, determination of problems and root causes, opportunity for improvement, follow up analysis, use of data for Quality System Review, etc.

Trends may be indicated by the use of existing data from the previous 2 years and are to be monitored by the participant.

Where a meaningful metric cannot be established some other means to assess progress should be described.

Possible metrics include, but are not limited to:

(1) Percent of CDRLs approved on first submission. (Increasing Trend)

(2) Number of test failures vs. total number of items tested. (Decreasing Trend)

(3) Number of Material Review Board (MRB) actions per month (engineering change proposals (ECP)/request for waivers (RFW)/request for deviations (RFD)). (Decreasing Trend)

(4) Percent of Product submitted on time. (Increasing Trend)

(5) Scrap Rate Percentage. (Decreasing Trend)

(6) First Pass Yield Percentage. (Increasing Trend)

(7) Success rate in solving major technical difficulties in space. (Increasing Trend)

(8) Success rate in solving major technical difficulties in weight. (Increasing Trend)

(9) Design complexity of Software/Hardware. (Decreasing Trend)

(10) Trend of unknowns to knows through maturity. (Decreasing Trend)

(11) Currency of design documentation, calculations, tests, etc. verses maturity of design. (Increasing Trend)

(12) Error free drawings/documents at each checking stage. (Increasing Trend)

(13) Design changes documented vs. changes incorporated. (Increasing Trend)

(14) Trend of predicted data/document deliveries vs. delivered. (Increasing Trend)

(15) Achievement verses Predictions verses Requirements.

(16) Short term tests at extreme conditions verses long term test at typical conditions.

(17) Currency of plans, prediction, tests to maturity of design. (Increasing Trend)

(18) Maintainability objectives met per design stage. (Increasing Trend)

(19) Proportion of tests producing useful data. (Increasing Trend)

(20) Adequacy of test records (completeness of information). (Increasing Trend)

(21) Test equipment functional failures vs. total activity or time. (Decreasing Trend)

(22) Trend of component interface problems. (Decreasing Trend)

(23) Availability of current applicable standards. (Increasing Trend)

(24) Calibration delinquencies vs. calibrated units. (Decreasing Trend)

(25) Purchase order error rate. (Decreasing Trend)

(26) Participants own system review findings - actions closed. (Increasing Trend)

(27) Unit production costs. (Decreasing Trend)

(28) Productivity/cycle time.

(29) Use of "in the field" defect information. (Increasing Trend)

5-1.5. DOCUMENT AND DATA CONTROL

a. Document approval and issue. The participant shall establish and maintain procedures to control all documents and data to meet the requirements established within their quality system. These documents shall be reviewed and approved by authorized personnel prior to being issued. The control over these documents shall ensure that: 1) pertinent issues of appropriate documents are available at locations where operations essential to the effective functioning of the quality system are performed; 2) obsolete documents are promptly removed from all points of issue and use.

b. Document changes/modifications. Document changes shall be reviewed and approved by the same functions/organizations that had performed the original review and approval, unless otherwise specified. The responsible function/organization shall have access to all pertinent background information, to ensure proper review and approval. When a change is incorporated the nature of the change shall be identified in the document or the appropriate attachments. The participant shall maintain a master list or maintain an equivalent document control procedure to identify the current revision of documents, to preclude the use of non-applicable documents. Documents shall be re-issued after a practical number of changes have been incorporated.

c. The participant shall establish and maintain a document control process. Document control should include those documents pertinent to design, purchasing, work execution, quality standards, inspection of materials and the participant's internal written procedures, at a minimum. Documents shall be available at the location where adherence is essential to quality performance. All changes to documents should be reviewed and approved by the organization that conducted the initial review. Controls should exist for the preparation, handling, issue, and recording of changes to documentation. The participant shall maintain an update of a master control list or equivalent reflecting the latest revision and distribution. The process will require timely disposal of obsolete documents.

5-1.6. PURCHASING

a. General. The participant shall ensure that all procured product conforms to specified requirements.

b. Assessment of sub-contractors. The participant shall select sub-contractors on the basis of their ability to meet sub-contract requirements, including quality requirements. The participant shall establish and maintain associated records of the acceptable sub-contractors. The selection of sub-contractors, and the type and extent of control exercised by the participant, shall be dependent upon the type of product and, where appropriate, on records of subcontractor previously demonstrated capability and performance. The participant shall ensure the quality system controls are effective.

c. Purchasing data. Purchasing documents shall contain data clearly describing the product on order, including when applicable: 1) the type, class, style, grade, or other precise identification; 2) the title or other positive identification, and applicable issue of specifications, drawings, process requirements, inspection instructions, and other relevant technical data, including requirements for approval or qualification of product, procedures, process equipment, and personnel; 3) the title, number, and issue of the quality system requirement to be applied to the product. The participant shall review and approve purchasing documents for adequacy of specified requirements prior to release.

d. Verification of purchased product. When the customer specifies in the contract, the customer or the customer's representative shall be afforded the right to verify at source or upon receipt that the purchased product conforms to specified requirements. Verification by the customer shall not absolve the participant of the responsibilities to provide acceptable product or preclude subsequent rejection. When the customer or the customer's representative elects to carry out verification at the sub-contractors facility, such verification shall not be used by the participant as evidence of effective control of the sub-contractor's quality.

e. The participant shall have procedures that ensure the correct flow-down of policy, procedure, design, and technical requirements to subcontractors. The participant system shall provide for the examination and verification of purchased parts to the extent necessary. A participant to subcontractor feedback system shall be demonstrated. The participant shall have a vendor certification program. The participant shall ensure that all vendors are informed of the program existence and its requirements. The program procedures should address and/or describe the assessment and selection of subcontractors. The participant shall develop and retain records demonstrating vendor selection, capability, and performance. Lot acceptance rates, on-time delivery, cost, and responsiveness should be factors in certification. Vendors are recognized for attaining certification, with an emphasis on long-term partnerships. The participant is encouraged to reduce the overall number of suppliers. Inspection of components from certified vendors is reduced or eliminated. Criteria for de-certification of vendors exist.

5-1.7. CONTROL OF CUSTOMER-SUPPLIED PRODUCT

a. The participant shall establish and maintain procedures for verification, storage, and maintenance of customer-supplied products, that are provided to produce, simulate, test or for incorporation into the product being supplied. Product that is lost, damaged, or otherwise unsuitable for use shall be recorded and reported to the customer.

b. Notification to the customer of product that is lost, damaged, or is otherwise unsuitable shall be documented and accomplished in a timely manner. Upon receipt, material shall be examined for damage in-transit, proper identification, and required quantity. The participant shall provide for periodic inspection of stored material for deterioration. Stored material shall be properly identified to prevent unauthorized use.

5-1.8. PRODUCT IDENTIFICATION AND TRACEABILITY

a. The participant shall establish and maintain procedures for identification of product from applicable drawings, specifications, or other documents, during all stages of production, delivery, and installation. The participant shall have traceability of individual product or batches to specified requirements. Identification to a product or batch is required and shall be recorded by the participant.

b. The participant should maintain a process for identifying material from receiving, storage, handling, and all successive stages of production, acceptance, and delivery/installation. The process will provide traceability of individual assemblies, subassemblies, parts, lots or batches as appropriate. Identification can be accomplished using tags, travelers, bar coding, or any other suitable and effective means.

5-1.9. PROCESS CONTROL

a. General. The participant shall identify and plan the production and installation processes which directly affect quality and shall ensure that these processes are maintained throughout under controlled conditions. Controlled conditions shall include but are not limited to: 1) documented work instructions defining the manner of production and installation, where the absence of such instructions would adversely affect quality, use of suitable production and installation equipment, suitable working environment, compliance with reference requirements, codes, and quality plans; 2) monitor and control of suitable process and product characteristics during production and installation; 3) approval of processes and equipment; 4) criteria for workmanship which shall be stipulated, to the practicable extent, in written requirements or by means of representative samples.

b. Special processes. These are processes where the result cannot be fully verified by subsequent inspection and/or test. Continuous monitoring and/or compliance with documented procedures are

required to ensure that the specified requirements are adhered to. These processes shall be qualified and shall also comply with the established requirements. Records shall be maintained for qualified processes, equipment, and personnel.

c. Work instructions will be available for all activities throughout the manufacturing process. The participant shall demonstrate advanced planning to identify, evaluate, and control processes. Processes will be controlled and the degree of control evaluated via statistical means. Special processes will be performed under controlled conditions, including work instructions. Personnel performing special processes will have the appropriate training and all required certifications. The participant shall demonstrate that the special process can meet the applicable requirements.

5-1.10. INSPECTION AND TESTING

a. Receiving inspection and testing. The participant shall ensure that incoming materiel is not used or processed until it has been inspected or otherwise verified as conforming to specified requirements. Verification shall be in accordance with the participants quality plan and/or documented procedures. When incoming materiel is released for urgent production purposes, the materiel will be identified and recorded to allow for immediate recall or replacement in the event of nonconformance to specified requirements. The participant, in determining the level of receiving inspection of the materiel, needs to consider the controls exercised at source and documented evidence of quality conformance.

b. In-process inspection and testing. The participant shall: 1) inspect, test, and identify materiel as required by the quality plan or documented procedures; 2) establish materiel conformance to specified requirements utilizing process monitoring and control methods; 3) hold materiel until all required inspection and tests have been completed or necessary data reports have been received and verified except when the materiel is released under urgent production requirements. Releasing materiel under urgent production requirements shall not preclude the activities outlined above; 4) identify all nonconforming materiel.

c. Final inspection and testing. The participants quality plan or documented procedures for final inspection and testing shall require that all specified inspection and tests, including those specified either on receipt of product or in-process, have been performed and all data meets specified requirements. The participant shall perform all final inspection and testing in accordance with the quality plan and/or documented procedures to demonstrate conformance of the finished product to the specified requirements. No product shall be released until all activities specified in the quality plan and/or documented procedures have been satisfactorily completed and the associated data and documentation is available and approved.

d. Inspection and test records. The participant shall establish and maintain records that provide evidence of the acceptability of the products inspection and/or testing as defined by their quality plan and/or documented procedures.

e. The participant shall assure that material received from subcontractors meets purchase order requirements. The participant shall have a method to take appropriate action when subcontractor nonconformities are discovered. The participant shall utilize past inspection data to adjust levels of inspection. The participant shall quickly identify non-conformities created in-process. Scrap and rework levels are low or declining. Procedures for positive recall of material released prior to inspection or test results being available must be documented. Inspection records should facilitate decision-making concerning product meeting requirements.

5-1.11. CONTROL OF INSPECTION, MEASURING, AND TEST EQUIPMENT

a. The participant shall establish, control, calibrate and maintain inspection, measuring, and test equipment, whether owned by the participant, on loan, or provided by the customer, to demonstrate the

conformance of the product to the specified requirement. Equipment shall be used in a manner which ensures that measurement uncertainty is known and is consistent with the required measurement capability. The participant shall: 1) identify the measurements to be made, the accuracy required, and select the appropriate inspection, measuring, and test equipment; 2) identify, calibrate, and adjust all inspection, measuring and test equipment, and devices that can affect product quality at prescribed intervals, or prior to use, against certified equipment having a known valid relationship to nationally recognized standards – when no such standards exist, the basis used for calibration shall be documented; 3) establish, document, and maintain calibration procedures, including details of equipment type, identification number, location, frequency of checks, check method, acceptance criteria, and the action to be taken when results are unsatisfactory; 4) ensure that the inspection, measuring and test equipment is capable of the accuracy and precision necessary; 5) identify inspection, measuring and test equipment with a suitable indicator or approved identification record to indicate calibration status; 6) maintain calibration records for inspection, measuring and test equipment; 7) assess and document the validity of previous inspection and test results when inspection, measurement and test equipment was determined to be out of calibration; 8) ensure that the environmental conditions are suitable for the calibrations, inspections, measurements, and tests being preformed; 9) ensure that the handling, preservation and storage of inspection, measurement and test equipment to assure accuracy and fitness of use is maintained; 10) safeguard inspection, measuring and test facilities, including both test hardware and test software, from adjustments which would invalidate the equipments calibration.

Where test hardware (e.g., jigs, fixtures, templates, patterns) or test software is used as suitable forms of inspection, they shall be checked to prove that they are capable of verifying the acceptability of product prior to release for use during production and installation and shall be rechecked at prescribed intervals. The participant shall establish the extent and frequency of such checks and shall maintain records as evidence of control. Measurement design data shall be made available, when required by the customer or representative, for verification that it is functionally adequate.

b. Participant shall comply with recognized industry standards and all contract criteria. Calibration documentation will include records of actual measurements. The participant will use historical data to adjust calibration interval.

Participant shall establish a Measurement and Test Equipment (M&TE) design review and approval system, which provides for an independent review. Participant shall establish guidelines for the development of M&TE designs. The participant shall assure that production tooling/process instrumentation, if used as a medium of inspection, is proven for accuracy and included in the calibration system. The participant shall provide for the independent review of designs for each inspection identified in the technical data package. Control of suitable resources, internal or external, used to design M&TE shall be assured. The participant system shall provide for periodic review and revision of designs due to product drawing amendments or changes in measurement standards. Configuration control for unique or special M&TE shall be established.

5-1.12. INSPECTION AND TEST STATUS

a. Inspection and test status of product shall be identified by using markings, authorized stamps, tags, labels, routing cards, inspection records, test software, physical location, or other suitable means, which indicate the conformance or nonconformance of product with regard to inspection and tests performed. The identification of inspection and test status shall be maintained, as necessary, throughout production and installation of the product to ensure that only product that has passed the required inspections and tests are released, used, and/or installed. Records shall identify the inspection authority responsible for the release of conforming product.

b. Participant's inspection and test program will positively identify the inspection or test status of product during all stages of the participant's operation.

5-1.13. CONTROL OF NONCONFORMING PRODUCT

a. The participant shall establish and maintain procedures to ensure that product and/or materiel that does not conform to specified requirements is prevented from inadvertent use or installation. Control shall provide for identification, documentation, evaluation, segregation when practical, disposition of nonconforming product, and for notification to the functions concerned.

b. Nonconformity review and disposition. The responsibility for review and authority for the disposition of nonconforming product shall be defined. Nonconforming product shall be reviewed in accordance with documented procedures. The deficient materiel and/or product may be: 1) reworked to meet the specified requirements, or; 2) accepted with or without repair by concession, or; 3) re-graded for alternative application, or rejected or scrapped. When required by the contract or order, the proposed use or repair of product or materiel which does not conform to specified requirements shall be reported for concession to the customer or representative. The description of nonconformity that has been accepted, and of repairs, shall be recorded to denote the actual condition. Repair or reworked product or materiel shall be re-inspected in accordance with the quality plan and/or documented procedures.

c. Authorized personnel such as engineering, product assurance, manufacturing and the Government representative shall accomplish review and disposition of nonconforming product if applicable. Re-inspection of repair/reworked product will use documented procedures.

5-1.14. CORRECTIVE AND PREVENTIVE ACTION

a. The participant shall establish, document, and maintain procedures for: 1) investigating the cause of nonconforming product or materiel and the corrective action needed to prevent recurrence; 2) analyzing all processes, work operations, concessions, quality records, service reports, and customer complaints to detect and eliminate potential causes of nonconforming product or materiel; 3) initiating preventative actions to deal with problems to a level corresponding to the risks encountered; 4) applying controls to ensure that corrective actions are taken and that they are effective; 5)

implementing and recording changes in the quality plan and/or procedures resulting from corrective action.

b. The participant shall establish an effective corrective action process that provides for the prompt detection, correction, and prevention of adverse quality conditions. The next level of management will evaluate corrective actions, which have been implemented and determined to be ineffective.

5-1.15. HANDLING, STORAGE, PACKAGING, PRESERVATION, AND DELIVERY

a. General. The participant shall establish, document, and maintain procedures for handling, storage, packaging, and delivery of product or materiel.

b. Handling. The participant shall provide methods and means of handling that will prevent damage or deterioration to the product or materiel.

c. Storage. The participant shall provide secure storage area or stock locations to prevent damage or deterioration of product or materiel, pending use, or delivery. Appropriate methods for authorizing receipt and the release to and from areas will be stipulated. In order to detect deterioration, the condition of the product or materiel in storage shall be assessed at appropriate intervals.

d. Packaging. The participant shall control packing, preservation, and marking processes to the extent necessary to ensure conformance to specified requirements and shall identify, preserve, and segregate all products or materiel from the time of receipt until the supplier's responsibility ceases.

e. Delivery. The participant shall arrange for the protection of the quality of the product or materiel after final inspection and test. Where contractually specified, this protection shall be extended to include delivery to destination.

f. Procedures for handling, storage, packaging, and delivery shall be in place to assure that products/items are functional and without deterioration, when needed by the user. Participant will provide for special customer storage, handling, packaging and delivery requirements, including explosive safety, control of Surety Material, etc.

5-1.16. CONTROL OF QUALITY RECORDS

a. The participant shall establish and maintain a quality plan and/or procedures for identification, collection, indexing, filing, storage, maintenance, and disposition of quality records. Quality records shall be maintained to demonstrate achievement of the required quality and the effective operation of the quality system. Pertinent subcontractor quality records shall be an element of this data. All quality records shall be legible and identifiable to the product or materiel involved. Quality records shall be stored and maintained in such a way that they are readily retrievable in facilities that provide a suitable environment to minimize deterioration or damage and to prevent loss.

Retention times of quality records shall be established and recorded. When agreed contractually, quality records shall be made available for evaluation by the customer or representative for an agreed period.

b. The participant shall have a process that assures that quality records are generated and maintained. The records shall be complete, concise, retrievable, and adequately describe work accomplished during manufacturing, assembly, inspection, and tests performed. Records must be stored to prevent deterioration and have a definite retention time established. All records will be made available to the customer upon request.

5-1.17. INTERNAL QUALITY AUDITS

a. The participant shall maintain a comprehensive system of planned and documented internal quality audits to verify whether quality activities comply with planned arrangements and to determine the effectiveness of the quality system. Audits shall be scheduled on the basis of the status and importance of the activity. The audits and follow-up actions shall be performed in accordance with documented procedures. The results of the audits shall be documented and brought to the attention of the personnel having responsibility in the area audited. The management personnel responsible for the area shall take the appropriate corrective action on the deficiency noted by the audit.

b. The participant has an effective internal assessment process. Sufficient resources are provided to effectively assess all internal systems, programs, and processes. Personnel assigned to auditing receive appropriate assessment training. An assessment schedule exists and is adhered to. Assessment reports are comprehensive and are distributed to senior leadership of the company. Timeframes are established for implementation of corrective action required. The participant responds to assessment reports in a timely manner. Audits are closed out in a timely manner.

5-1.18. TRAINING

a. The participant shall establish and maintain a quality plan and/or procedures for identifying the training needs and provide for the training of all personnel performing activities affecting quality. Personnel performing specific assigned tasks shall be qualified on the basis of appropriate education, training, and/or experience, as required. Appropriate records of training shall be maintained.

b. The participant must have an effective training process. Management must assess the needs and provide for the training of all personnel and assure that proper records are kept. Training shall include administrative, quality, and technical functions as necessary.

5-1.19. SERVICING

a. When servicing is specified in the contract or order, the participant shall establish and maintain a quality plan and/or procedures for performing and verifying that servicing meets the specified requirements.

5-1.20. STATISTICAL TECHNIQUES

a. When appropriate, the participant shall establish procedures for identifying adequate statistical techniques required to verify the acceptability of process capability and product or materiel characteristics.

b. Active, effective utilization of Statistical Process Control (SPC) exists. The SPC process contains provisions for: 1) management commitment to SPC; 2) organizational structure; 3) SPC training; 4) vendor SPC; 5) criteria for use of SPC; 6) process capability studies; 7) control chart policies; 8) measuring and test equipment; 9) SPC records; 10) SPC assessment and review; 11) elimination/reduction of inspection; 12) SPC computer hardware/software application. Detail SPC applications for individual products are developed and implemented. Reliance on inspection and test is minimized due to SPC implementation. Other additional statistical techniques must be effectively implemented and be appropriate for the participant's operation.

5-1.21. CUSTOMER SATISFACTION

a. Participant shall assure that all levels of the organization are aware of who their customers are - internal and external. A formal channel for customer communications is established. Product complaints and responses are documented and available for review. Responses should be timely and customer-oriented, with follow-up if necessary. Customer satisfaction should be measured via customer surveys and other means.

5-1.22. QUALITY COSTS

a. The participant shall collect and maintain financial costs of the quality program as a percentage of total costs. Costs to be collected, with examples shown in parentheses are as follows: prevention (training, auditing, vendor visits, etc.); appraisal (inspection, test, x-ray, etc.); and failure (scrap, rework, screening, warranty, etc.). Records should show management review and assessment of quality cost data.

5-1.23. WARRANTY PERFORMANCE

a. A documented warranty processing system exists with a central point of contact established and communicated to appropriate customers. The participant's warranty process is similar to the quality deficiency report process with a minimum of administrative criteria. The participant is amenable to receiving warranty

claims and is cooperative in developing and implementing corrective action, in a timely manner. The participant assumes responsibility for appropriate costs.

5-1.24. ETHICS

a. The participant shall have an ethics or standards of conduct policy which is communicated to employees at all levels. Employees acknowledge awareness of and pledge adherence to the company's ethics policy. The policy should specifically mention business relationships with government employees.

5-1.25. BUSINESS PLANNING

a. The participant's business strategy should be clearly demonstrated through the performance of short and long-term business planning. Continuous improvement in quality and productivity is part of business planning. Business plans are evaluated and updated regularly.

5-1.26. SAFETY

a. The participant has established an effective safety process which is communicated to employees at all levels. Personnel are provided with appropriate protective equipment. Employees have a means to report unsafe practices. The participant has evidence that they comply with all applicable Federal, State, and Local safety regulations.

5-1.27. ENVIRONMENTAL

a. The participant has established an effective environmental compliance process. The participant should have appropriate environmental equipment to control hazardous output of production processes. Employees have a means for reporting environmental problems. The participant has evidence that he complies with all applicable Federal, State, and Local environmental regulations.

5-1.28. CONTINUOUS IMPROVEMENT PROCESS (CIP)

a. The participant shall have a Continuous Improvement Process, which is maintained by Senior Management. It shall contain, as a minimum, a policy statement from management on the need for continuous improvement, a number of short range and long range Goals, and the appropriate metrics to measure trends. Major findings from the $(CP)^2$ $_{2000}$ assessment and their metrics shall be tracked in the CIP. Additional key indicators used by participant should also be included, as well as the "What, When, Who, and How" for each. The CIP should be a flexible document and change as new areas for improvement develop. The CIP forms unique guidelines for reaching out beyond $(CP)^2$ $_{2000}$ certification, and enables the participant to demonstrate effective self-audit and continuing drive for improvement. Participant will report on progress of the continuous improvement plan and achievement of goals to the lead MSC at least semiannually.